

Owners Operation & Instruction Manual for PG160, PG225 & PG300



Manufacturer of Quality Power Sprayers

Congratulations on your decision to purchase a SDI sprayer. SDI has been manufacturing a full line of quality sprayers since 1982.

We take great pride in our products and we make sure our sprayers work properly when they leave the factory. Each sprayer is assembled and tested prior to shipment. We make every effort to insure that reassembly in the field and the addition of optional accessories is done properly.

If you have any problems with the assembly or operation of your new sprayer, please call our Customer Service Department at 559-SDI-5555 between the hours of 7:00 am and 4:00 pm, Pacific Time.

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General Specifications - All Models

Tank / Agitation / Color:

All SDI tanks are constructed from fiberglass, hand rolled for maximum density and strength. The exterior is a high-gloss color impregnated gel coat with UV



inhibitor. The interior is sealed with chemical resistant isophthalic resin for long life and easy complete cleaning. Each tank is equipped with an offset 16" screw-in lid with spring-assisted bullet venting and c-pillow perimeter ring gasket sealing system. A nylon mesh strainer basket with reinforcing ribs is also standard with your sprayer.

The unique SDI design has a raised bottom attached to directional side gutters to effectively direct the solution to the rear sump. This design allows your sprayer to maintain performance even at low liquid levels. This is combined with a custom anti-vortex sump plate and a V-6 hydro mix venturi-jet agitation system.

Inside the tank, the six venturi agitation jets with long wearing ceramic orifice discs provide a steady 3 to 1 exchange of liquid.

The external liquid sight tube has calibration marks in gallons on the front corner of the tank. The tank is secured to the carrier frame by 4 tank anchor assemblies.



Frame / Pump / Booms:

The frame is fabricated from high strength welded steel. It is then coated with a durable epoxy coating. The sprayer pin-mounts directly to the vehicle frame in place of the dump box.

Pump: The pump is a positive displacement, 3-cylinder, piston-diaphragm design with positive pressure backed desmopan diaphragms, aluminum case, epoxy-coated fluid manifolds and integrated pulsation damper. The pump is conveniently mounted on top of the tank at the rear of the sprayer and is powered by the vehicle's auxiliary hydraulic system. Plumbing is reinforced nylon and stainless steel fittings with rubber or reinforced plastic/nylon/PVC blend hoses. The see-thru oil fill/reservoir indicates diaphragm integrity status. All moving internal components are in a flooded oil bath design for lubrication and full dynamic diaphragm action.

Maximum Capacities/Pressure: Up to 30 GPM @ maximum vehicle hydraulic output capacity. Up to 200 PSI maximum system pressure developed at relief valve pressure gauge with the agitation valve closed.

The pumps hydraulic drive system reaches maximum performance with the vehicle's engine speed at 3000 RPM. The vehicle operating RPM's may change the hydraulic system output which may affect pump speed/output. Factory settings allow sprayer to operate in the most common vehicle engine RPM/gear settings for spraying (2-7 MPH). Other extreme spraying requirements may require minor component adjustment with tips from the factory for best results/performance. We recommend a maximum operating RPM of 3400.

SDI "Economy" Manual Lift (Equal Flow) Booms:

Our SDI "Economy" wet booms feature all steel support frames with variable adjustment mounting and height adjustment brackets. The equal-flow design includes equal length 304SST tubes with nylon end caps, nylon feed saddles with 3/4" inlet and 3/4" feed hoses. The nozzle bodies are polypropylene, 10 PSI, diaphragm check assembly, 1/4 turn on/off locking cap with gasket and 50 mesh slotted nylon tip strainer. Test tips are TeeJet 11008VP polymer material included. Other sizes, styles, etc. are available upon request for additional charge. Breakaway hinge with forward and reverse action, fold-up for transportation and adjustable dampening spring are also standard.

SDI OPTIMUM Turf Booms (Standard and Convertible):

Our Optimum booms have precision jig welded nozzle mounts for nozzle position accuracy. This design keeps all nozzles in perfect alignment versus pipe supported designs, wet or dry. Direct liquid injection to each nozzle through precision designed dry style nozzle inserts with 3/4" hoses. This eliminates dead spots in fluid path as well as product buildup from heavy powder applications or neglect (failure to rinse after use). Heavy duty breakaway hinge has swag style cable level anchor system. You have the ability to add 12 volt actuators for powered boom wing section lift and descent. The ground contour wheel option allows constant contact "tip to ground" pattern protection minimum height adjustment. The standard triple nozzle body assemblies include cap, gasket, slotted strainer, and polymer test tip. Additional nozzles and adapters are available upon request for additional charge. The convertible boom features flip-out wing extensions for increased area coverage and additional spray width. The liquid to the outer wings is controlled thru a manually operated ball valve.

Safety Data:



This symbol is a safety warning and appears next to information which may help keep you and others from being injured.

Personal Protective Equipment:

Personal Protective Equipment (PPE) is required to prevent accidental exposure or poisoning. Your chemical label has a complete listing of required PPE needed for that specific material. Some PPE may include;

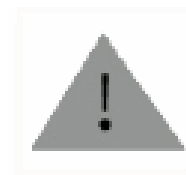
Spray Suit – Full coverage (arms and legs) – free of rips or tears.

Face Shield – To prevent accidental facial contact with chemicals.

Goggles – To cover eyes or your glasses for better protection.

PVC/Nylon Gloves – Protects hands and sleeve openings.

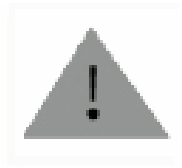
Mask/Respirator – Approved canister type with appropriate filter cartridges for chemicals being used.



Work Area Safety Recommendations:

- **Fill/Mix and Load Station** – area should not be high traffic and should have run-off containment. DO NOT allow non-spray personnel to enter mix area. All mixing should be performed with PPE in place.
- **Water Supply** – we recommend using anti-back flow protection on fill hoses and water source outlets. An Air Gap Filler (anti-siphon) is available as an option.
- **Fill Hose** – should never be put into spray tank, you could contaminate the hose and your water source.
- **Moving Mechanical System Parts** – keep hands away from rotating pump shaft and restrain loose clothing. Use caution around system when in operation.
- **Broken or Worn Components** – follow recommended safety and repair/maintenance schedules. DO NOT operate without proper safety gear or if machine is not in proper working order. Proper operation is not only safer but, it is more economical when you properly apply the desired chemicals at the correct rate.
- **Record Keeping** – proper records showing chemical being used, batch size, time, date, areas treated, weather conditions, unusual occurrences can protect you and others should any problem occur after a turf application has been made.

- **Licensing** – it is recommended that all spray technician operators secure proper CPA (Certified Pesticide Applicators) license or equivalent. Check your local regulations.



Warning: SDI strongly recommends that you read and understand completely, the Operator’s Manual for the specific truck you mount the sprayer to – be confident and sure of your skills before operating the truck with the sprayer attached. The large liquid payload reacts differently during vehicle movement, than an equal size dry load!

Please Use Caution!

Decals / Serial Tag Locator:



Decal, Part # 70-301 - “Caution”- located on the upper left corner at the rear of the spr

Decal, Part # 70-090 - “Warning” – located on the tank sump.



Decal, Part # 70-357 - “SDI Model#/Serial# Tag”- located on the sprayer’s frame. You will need to provide this information to your dealer when ordering parts.

Control Identification:



EC-VM400



EC-VMAFS



MicroTrak MT3403AFS



Raven SCS330 Control



Raven SCS440 Control

*****Please refer to the individual control manual for detailed descriptions and features for each model.***

Pre-System Operation Checks:

See your Vehicle's Operation/Maintenance Manual for specific instructions. SDI recommends you read it completely. Typical checks: fuel, oil, and tire pressure.

Spray Tank Checks:

- Frame hold down hardware – there should be a gap between the bracket and tank flange, don't over tighten, tank damage may occur.
- Visually inspect the fiberglass spray tank for leaks or cra
- Visually inspect sprayer frame for cracks or broken welds.
- Check all fasteners for tightness – replace worn items as needed.
- Lid and Gasket (Lid Threads) inspect for leaks or warping, wipe off dirt from threads and gasket. Apply light lubricant to gasket, such as silicone spray. Check operation of spring-assisted bullet vent in lid center – remove any debris and clean or replace broken or missing springs (spring critical to leak-free lid design). Replace any c-pillow perimeter lid gasket if damage is present. Some repairs can be made with a vulcanizing adhesive application. Consult the factory for options.
- With the lid open and basket removed, visually inspect the inside of the spray tank for flaking, and residue buildup. Also check the anti-vortex plate (black circle in sump area) and sump for debris. A blocked or restricted suction can result in poor performance and pump problems.
- Check jet agitator venturi nozzle position – aim as necessary.
- Periodically check ceramic orifice discs in venturi nozzles for cracks or blockages. These problems can lead to reduced agitation and possible products mixing problems. Replace or clean as needed.
- Inspect hoses for rubs, cracks or any damage that could result in a leak of fluid – repair as needed.

Pump and Power Checks:



CAUTION: Normal vehicle engine RPM operating range for sprayer use is 2500 to 3400 RPM's and 1st, 2nd, and 3rd gears in the low range. Consult the factory if you need to operate the machinery at settings other than those specified.

- Inspect exterior of pump, drive motor, and hydraulic supply hoses for damage or leaks that could cause problems later. Consult manuals for repair options.
- With each fill-up of sprayer tank, inspect the pump's see-thru oil reservoir for evidence of diaphragm failure. Oil will appear milky or cloudy if one or more diaphragms has structural damage allowing chemical into the pumps lubrication environment. Replace damaged diaphragms and replace oil in pump body with recommended non-detergent oil.

- Inspect and clean pump suction strainer screen.
- Inspect bowl and gasket – improper gasket seating can result in poor pump performance. Replace with correct size gasket only! During bowl replacement, hand tighten only! *DO NOT USE ANY TOOLS!*
- Remove black nylon suction strainer bowl and clean the screen of debris. 20 mesh is factory standard size. Using 40 or finer mesh will require checking more often for trapped debris in the screen. A plugged mesh can result in decreased fluid availability to the pump (starved-suction condition) resulting effects can range from poor output/performance to the extreme – diaphragm surface ruptures/tears.
- Check bottom load 3-way suction ball valve and turn handle to pump suction (**arrow points up**) arrow points to direction of fluid flow through valve. Arrow to side is off, arrow pointing down will drain tank contents. *Do not place valve handle in off or drain position while pump is running – diaphragm damage may occur from starved suction environment.*



- Check to see that agitation control valve is fully open. Turn knob to the left (counter clockwise) to open. Due to the unique design of the tank bottom suction and anti-vortex area – turning the agitation down or off when the tank is low on gallonage is not necessary. The tank will pump down to dry with the agitation fully on.

Spray Boom Checks:

- Inspect mounting hardware and support frame for fastener tightness and worn or broken components. Repair as needed.
- With vehicle tires properly inflated and tank ½ full of water, check boom for level and proper height. See Setup Manual for proper adjustments.
- Grease boom hinges (breakaways), be sure and remove any debris (i.e. grass, sand, dirt, etc.) from greased area on pivot plates. Dirt affects the proper operation of the breakaways.
- For proper boom retraction, adjust the return spring tension to stiffen or loosen the movement. See Setup Manual for details.
- With booms in the down (operational) position, check section level again.
- Between sprays, check and clean all boom nozzle assemblies. Inspect check valve diaphragms for tears or warping, check and clean tips with a soft nylon tip brush (DO NOT use hard/metal items – tip damage will occur!). Clean strainer screens and tip gaskets also. Replace worn or defective items as needed. Proper tip maintenance will result in optimum performance and pattern development.

- Inspect boom tube end caps for cracks or leaks. Repair as needed.

Motorized Valve Control Checks:

- Check battery connections – alligator clips – for correct polarity hook up. Check wire fastener screw on clips for tightness. Remove any corrosive terminal buildup with a mixture of baking soda and white vinegar. Apply with an old toothbrush. Brush away buildup taking care to protect your eyes and clothing from acid splashes. **USE EXTREME CAUTION** during this cleaning, **ALSO – NO SMOKING** – flammable hydrogen gas can be present!
- Check control box mount and console wing nuts for tightness. Clean dirty console with a damp cloth. **DO NOT USE** solvents or pressure washer.
- Check all toggle switches for play and replace as needed. If switches are rubber booted, check boots for tears and replace worn ones.
- Check control console pressure gauge bezel (clear plastic ring which holds gauge into console). Raised tabs should be at 6 and 12 o'clock positions.
- Check back side of console and make sure power and control cable assemblies are locked into multi-pin connectors. Then replace protective rubber boots.
- Check fuse and rubber boot.
- Check plastic pressure gauge tube for kinks, breaks or blockages. To clean a blocked tube;
 1. Put some clean water in the spray tank (2-5 gallons).
 2. On back side of console, is a metal tube receiver with 1/8" tube engaged. Push tube and top of metal coupler with your thumb and index finger.
 3. While holding metal ring in, pull tube out with your other hand.
 4. Direct the disengaged tube away from box and face, and allow the debris to clear from tube.
 5. Turn sprayer on and set engine RPM's to 3000 on truck.
 6. If unsuccessful, stop and shut sprayer off.
 7. Disengage other end of tube from boom valve inlet.
 8. Use OSHA approved rubber tipped air nozzle to force high pressure air through tube.
 9. If still unsuccessful, replace with a new tube and start flushing procedure again.
- Move to rear of sprayer – boom area.
- Inspect motorized valve harness connector plugs – they should be tight against valve body – screw tight – no prongs showing from valves.
- Check valve mating joints (seams) for product leakage. If leakage is detected, tighten nuts on the 4 guide rod bolts and bring valves closer together. Not too tight – o-rings are in each joint area. If leak persists, separate valve bodies and replace o-rings with new ones.

- Check that all horseshoe clips on boom feed barbs and metered by pass valves are pushed in and secure. Leakage can result if u-clips are not in place.
- Follow boom hoses from each motorized valve to the corresponding boom section – nylon split-eyelet feed saddle with nylon hose barb adapter should fit tight against SST tubing. If saddle rotates on tubing (alignment nipple most likely broken) replace as needed.
- Move back to control console – LISTEN carefully as you perform the next checks.
- Push up on pressure adjust toggle switch – servo motor on yellow striped valve should run. Reverse toggle position and verify motor works in both directions. Failure – See Troubleshooting Section.
- Push master power toggle to on position – now one switch at a time, try each boom section, in both directions. Verify that the valves are working in both directions. Failure – See Troubleshooting Section.

Electric Boom Lift Actuators (optional equipment):

- For setup and complete instructions, see Boom Lift Owners Manual.
- Check both actuator mounting bolts for tightness and for wing down position parallel to ground position, adjust level to ground with swag cable anchor eyebolt.
- Periodically spray a penetrating lubricant onto pivot points, hinge bushing assemblies and swag cables.
- Check control harness fuse, it should have a 30 amp rating.
- Check control console toggle switch for play and proper operation.
- Check harness connectors at control box pigtail and each actuator pigtail hookup.

Foam Marker (optional equipment):

- For setup and complete instructions, see Foam Marker Owner's Manual.
- Inspect solution tank for leaks or cracks.
- Check cap assembly for cracks or leaks.
- Check the fuse in control harness, it should have a 10 amp rating.
- Be sure to only use SDI Foam Concentrate, other brands may cause adverse performance.
- Activate power switch to left and then right positions and verify compressor will start up and if container has fluid, liquid should flow to the blue tube on the corresponding foam generator cone and foam should start or liquid will drip from outlet steadily.
- The foamer uses two solenoids per side. One is for air, the other for solution. White hoses carry air to system, blue hoses carry solution. Hose connections are colored coded white or blue, so are the fly nuts and hoses.



Just match the colors and make sure to get adequate hose on bib contact before tightening down on fly nut fastener. If system fails to start, check 12 volt power supply first. System is run/tested at the factory prior to shipping to your dealer for installation. A running system will not foam with water only – 160:1 ratio (water: concentrate) or similar solution must be added to the solution tank's water. SDI foam concentrate is recommended for best machine performance. We suggest you add the foam concentrate first then water. Also, the foam solution will go inert in 24-36 hours.

- Check supply hose fasteners on boom tubes for proper position, tightness, and routing. Should not interfere with tips or nozzle check valves – Loom (black ribbed cover) should run along the top of boom tube fastened with nylon zip ties.
- Check foam generator cone position, it should be at boom wing end and clear the spray pattern distribution area. Keep the cones out of spray by tilting up (required for raindrop style tips).
- After use, clean the foamer drop tubes.

Hose Reel (optional equipment):



- Check supply hose from pressure side of pump to swivel inlet on reel drums for cuts, scrapes, kinks or leaks.
- Lubricate reel swivel at grease zerk if so equipped.
- Check the reel to tank hold down hardware for tightness. Rubber well nuts and fender washers should be used with SST bolts.

See Hose Reel Mounting Instructions and fastener use sequence.

- If electric rewind, check battery and all power harness connections. A 40 amp circuit breaker should also be part of the electrical hookup.

System Dynamics

How Your System Works and Why they call it a Sprayer:

POWER – The utility vehicle’s auxiliary hydraulics provides fluid to sprayer’s pump drive motor. The on/off control lever is located on the center control console. Pull the lever back to activate the auxiliary hydraulics.

Fluid path through sprayer – items 1 through 12:

1. **Spray Tank** – serves as containment for fluid and as the product mix chamber – made of fiberglass and resin compound. Unique bottom shape has a raised bottom attached to directional side gutters to effectively direct solution to the rear sump. This design allows sprayer to maintain performance even at low liquid levels. This design also works as damper (anti-slosh control) for fluid levels with less than a full tank.
2. **Anti-Vortex Plate** – located in sump (lowest part of tank interior), it facilitates complete liquid draining, minimizing pump cavitation (suction loss or loss of prime).
3. **Suction Flange** – external hose barb assembly on tank sump area – connects tank to main suction hose.
4. **Suction/Off/Drain “Bottom Load Valve”** – large 1½” 3-way ball valve (all-in-one design). Arrow on handle points in direction of fluid flow – up (suction/pump) – side (off) – down (drain). Off allows cleaning of suction strainer screen with loaded tank. Pump should only be running when arrow points up (suction open) – pump diaphragm damage can occur when valve is off or drain position while running (starved suction conditions).
5. **Suction Strainer** – filters our particulate matter and debris from supply tank. Extends pump life and eliminates foreign objects which may disrupt normal boom or gun operations.
6. **Diaphragm Pump** – piston/diaphragm design uses desmophan diaphragms attached to a piston top and supported by trapped oil from pumps main case. Stainless steel and nylon spring valves control the fluid during suction and discharge strokes. The pulsation dampener controls the pulsations of liquid sent to the boom.
7. **Pressure Regulator** – controls peak allowable pressure to systems accessories. T-handle turns clockwise to raise system pressure and counter clockwise to lower system pressure. Once desired pressure is reached tighten lock nut on base of T-handle to fix the setting. Once system is charged to set limit an internal spring and seat releases the excess pressure and fluid for low pressure recirculation back to the tank through the bypass hose. Use a maximum pressure of 90 PSI for boom spraying. **Be sure to reduce the pressure to less than 100 PSI after using the hose reel.** This keeps the gauge on the control box from damage or failure.

8. **Agitation Control Gate Valve** – controls amount of tank agitation by amount of liquid through venturi nozzle multiplier orifice. Recommend you leave full open at all times. No need to close with low tank liquid level.
9. **V-6 Jet Agitation** – located above the sump channel at the back of the tank. 6 venturi style nozzles with ceramic metering orifice disc multiply the exiting fluid and disperse materials throughout the solution tank – hydraulic mixing.
10. **Hose Reel** – hose holding spool which allows hookup of spray system to a spray handgun or walking type spray boom. Holds and organizes supply/spray hose for repeated organized uses.
11. **Boom (Boom Controls)** – supplies liquid to the motorized valve assemblies for dispersal through the spray boom.
12. **Boom Tubes** – SST pipe or ¾" hose with nozzle bodies attached, evenly distributes spray liquid to target (ground, turf area) with over lapping pattern. Nozzle bodies are diaphragm check (drip-free) and supply the nozzle (tips) when liquid pressure exceeds 10 PSI. When boom shuts off, the diaphragm keeps the tips from dripping products and also allows a quick air-free (hiss-free) resumption of the spray pattern.

Notes on System Dynamics

Diaphragm Pump Lubrication – internal mechanical components operate in a flooded oil bath environment – the pumps cylinder diaphragms keep contaminants/spray solution from entering the oil's environment. Diaphragms should be inspected yearly and replaced when wear or abnormalities are discovered. The case mounted see-thru oil reservoir will be cloudy if spray has entered the oil's environment. The pump can handle all materials and run dry (no solution) without damage as long as you have clear suction. If you replace the pump diaphragms, replace the pump oil with non-detergent oil to prevent against excessive foaming. See the pump manual for recommendation of type and viscosity.

Venturi-Jet Agitator Nozzles – installed with ceramic metered orifice disc (long wearing vs. plastic). Long lasting ceramic discs provide stable agitation flow rates for trouble-free fluid mixing.

Suction Strainer – provides filtering of particulate matter in spray material. The standard screen mesh size is 20 in SST material. The screen should be cleaned daily or more often as the need arises.

Non-Corrosive Plumbing – all spray plumbing is SST, nylon or PVC or polypropylene for all liquid handling parts.

System Dynamics – Materials Compatibility

- SDI's diaphragm pump is capable of pumping almost any nonflammable liquid without trouble or damage to the pump. On extremely thick or gritty suspensions, it is advisable to operate the sprayer with the suction strainer screen removed. Clogging up the screen can starve the pump and cause premature diaphragm damage. For materials with high residue, it is advisable to rinse pump and plumbing as soon as you return to the sprayer fill area. Do not wait until after a long lunch break – just add a few gallons of clean water to the tank and run pump for 30 seconds to dilute the previous residue in system.

Avoid heavy, thick dye markers and add dyes into a full mixing tank, not an empty filling tank. See Troubleshooting Section for scrubbing suggestions.

- **Spray Liquid Viscosity** – the addition of certain WP, WDG, EC's etc. may cause the viscosity (thickness) of the water to increase. This can sometimes affect your calibration of the spray nozzle output. Consult chemical supplier for recommended modifications to your system.
- **Specific Gravity of Sprayed Suspension** – water weighs 8.34lbs./gallon – when you add mix to the water, the weight per gallon will change. The weight of the finished solution changes the output calibrations of your nozzles. Consult your TeeJet catalog for recommendations and formulas for adjusting. This step is very important when using computer controlled rate systems.

Getting Started:

Practice with water – after you have followed all recommendations, it is advisable to familiarize yourself with the operation of the new truck and sprayer package. Practicing with plain water before the addition of expensive and potentially destructive chemical formulas (when miss-applied) can be smart and cost effective.

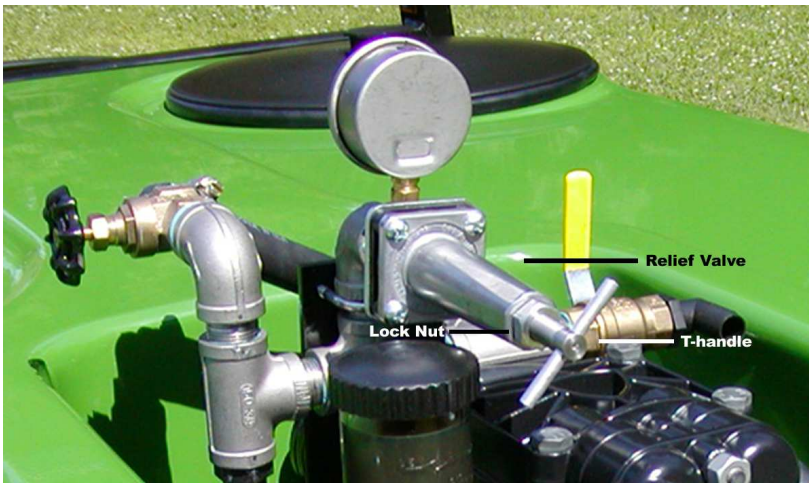
Practice and calibrate before you spray dollars away! Know your machine and its operation.

System Pressure Adjustment:

Pressure adjustment procedures vary by control style.

Set Pump Output Pressure and Agitation - set speed limiter on vehicle's throttle to a RPM that corresponds to desired MPH with selected gear and range of spraying. Open suction valve on sprayer, then pull auxiliary hydraulics lever on vehicle's center console.

Go to pump assembly and close all outlet valves (agitation, boom supply,



and hose reel). This will give the system a closed loop for proper setting of the system pressure relief. Adjust relief valve by loosening lock nut then turn T-handle to right to increase (raise) pressure or to the left to decrease (lower) system pressure shown on

the liquid dampened gauge. Set pressure in closed loop to 90 – 100PSI. This setting is below the pressure rating for boom components.

Once the system is set to a fixed pressure you can open and set the tank agitation output. The gate valve will allow a full range of setting by turning the knob left for more agitation or turn the knob right for less. The maximum allowable flow is metered by ceramic orifice disc inside the venturi jet nozzles. System pressure may drop but should remain above the maximum needed for boom spraying.

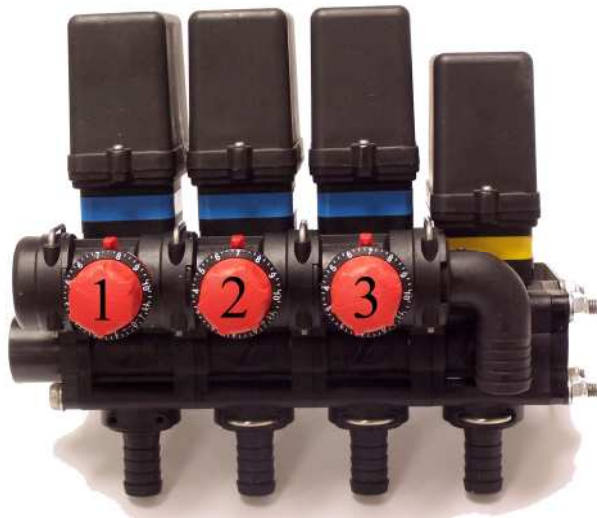
12 volt Motorized Boom Valves and

Adjusting the Metered Bypass –

follow the same setup procedures on pump and relief valve adjustment to set system pressure to 90 – 100 PSI. Turn all switches on console box to off position and hold down on pressure adjust switch until pressure will go no lower (motorized regulator in full bypass/open setting).



Turn all metered bypass knobs on motorized valves to the right until closed. Push up on pressure adjust switch until the console mounted gauge reads 40 PSI then stop. Push boom switches 1, 2, and 3 to up/on position then activate the boom master switch to the up/on position. All three boom sections should be spraying and console gauge will probably show less than 40 PSI. Use the pressure adjust switch to raise the boom pressure to 40 PSI. With system at 40 PSI, turn boom switch #1 switch to off – pressure should rise above 40 PSI.



Move to motorized valve and open metered bypass knob #1 counterclockwise until pressure drops back off to 40 PSI. Position yourself so you can see the electronic console's gauge or have someone help you by calling out when you have adjusted back to 40 PSI. Cycle the #1 boom switch on and off as you watch the pressure gauge reading.

Except for a short bounce of the gauge's needle, the final pressure should read 40 PSI. If it is ok, repeat steps for boom section #2 and then for boom section #3. Advanced users will notice a live boom pressure when console master control is off. Now it is possible to change speeds and also correct the nozzles output volume/pressure while the boom sections are off (no more puddles under a stopped boom!). Remember, as long as the tip size in the boom remains the same as was in during metered bypass setup, you can run the nozzles in the full pressure range.

Speed compensating computer equipped sprayers can operate in the manual mode and follow same guidelines as standard motorized adjustment (no metered bypass to adjust). The controller should be in manual mode to adjust pressure on the system. **Note: computerized systems work on flow, not pressure.** These systems will still show flow rate field if the speed sensor and flow meter are operational. In auto mode you the output will vary, this is normal. When the

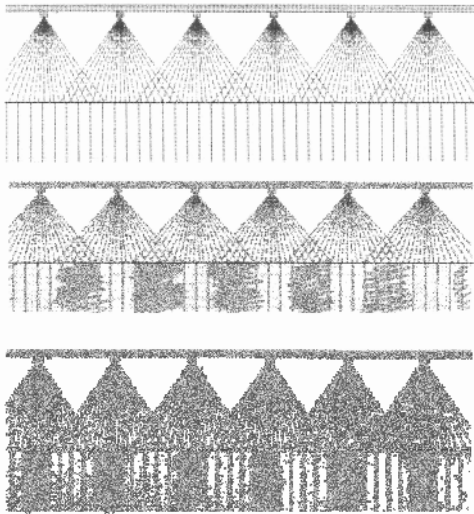
computer is in control, it makes corrective adjustments many times faster than the operator could even think about.

Pressure adjustment is important to obtain the proper nozzle output based upon the standards given in the boom calibration formulas. Refer to the operation manual for your system.

Boom Spray Tip Overlap Checks:

To verify the boom is properly set up and tip/nozzle height is correct, a water only pass over a dry concrete or asphalt parking area, can reveal much information about your system's setup.

With only water in tank, operate machine and spray with boom full on and drive



and apply a pattern to the dry driveway/parking area. After the first pass, observe the spray pattern and look for uneven areas.

Uniform and even drying indicates the system applying a uniform pattern. Checks of each nozzle with a calibration catch container can assist your data on the system. Uneven drying or wet stripes can identify overlap problems.

Wet stripes between nozzle tips can mean the boom is too high – dry strips under the nozzles may indicate the boom is too low.

The supplied 11008VP polymer test tips are a tapered flat-fan design and require a minimum of 30% overlap when mounted on 20" spacing (this is with a tip to ground height of 20"). Consult the manufacturer's recommendations for the style of tip you plan to use. Patterns, overlaps, sizes, materials, droplet size, and pressure range can change with the tips selected. Test with water if you have no experience with new nozzles.

Spray Operation:

The sprayer was designed to operate at an engine speed of 2500 RPM's to 3400 RPM's. The hydraulic drive diaphragm pump reaches full volume at 3000 RPM's on vehicles tachometer.

- Park vehicle on level ground with parking brake on – truck in neutral and engine off.
- Safety equipment should be used during all sprayer operations as a rule. Safety equipment should be in good condition, with no rips, holes, or tears. Your

spray suit, neoprene/PVC gloves, goggles/face shield and approved breathing device (respirator).

- Sprayer mix and load area should not be a high traffic area or visited by workers who are not properly protected with safety equipment.
- To open the 16" filler lid, grasp the lateral raised ribs on lid and rotate counter clockwise.
- If equipped with an anti-siphon device (air gap filler) for back flow protection, rotate and lock gooseneck filler into position.
- Attach water feed hose and slowly turn on water source and bring up to full stream.
- We recommend that the strainer basket be left in place and used to strain all materials being put into the tank.
- Pump suction strainer should be installed if not already in place. Also, open the bottom load valve to the pump at this time.
- Determine amount of spray mix to be used for your application. If required amount is less than full tank capacity, fill to desired level.
- If required amount is a full load (tank topped off), then only fill to a $\frac{3}{4}$ liquid level. This leaves room for adding chemical to be mixed and applied. (The balance of the fill water will be added later.)
- Place truck in neutral with parking brake engaged.
- Start engine according to procedures outlined in Truck Owner's Manual.
- Using throttle lock (manual or electric), set engine speed to 2500 RPM's.
- On vehicle's center console – pull auxiliary hydraulics lever back and turn the pump drive on. If not operating, review the Troubleshooting Section for ideas.
- A quick look into the open lid assembly can verify the pump is working by the movement of the tank contents. The agitation control valve is located with the pump and relief valve on the back section of the spray tank. Adjust to level of agitation required as described earlier. ****NOTE**** if system fails to work as described, shut auxiliary hydraulics to pump off and check Troubleshooting Section for possible cures.



- Once the system is operational, a quick system test should be performed before adding product to the mix tank.

- Lower boom wings to the operational position. Be sure area is clear of non-authorized spray personnel.
- Turn on Master Boom Control (switch or lever) and adjust pressure to 40 PSI on controller pressure gauge.
- Check the boom assembly for leaks. Leaks or other damage can occur from shipping your sprayer. Inspect hose fittings, nozzle assemblies, end caps and the complete system. Repair and/or re-tape any leaking fittings. STOP all drips!
- All nozzles should become active and develop a full pattern. Clean or repair all non-working assemblies.
- With your calibration formula completed, tips properly sized for your application and your operating pressure set, you may now proceed.
- Restart truck and engage the pump and agitation system.
- Slowly add the chemical to be applied to the agitating tank water. The addition of some products, all-at-once, may cause damage by plugging the in-line suction strainer screen which can cause a starved suction condition. Product labels (WP, EC, WDG, etc.) are abrasive in nature and should include extra mix time in the tank. Prepackaged dissolvable bag types can be difficult to mix rapidly. The slower dissolve rate of the bag may lead to clogged suction strainers. Liquid products can mix easier than most dry formulations, but can be difficult to mix in cold water areas. Consult with your chemical supply rep for any precautions or mix-it-up suggestions for any unfamiliar products.

****ALERT** TO ALL TEST PILOTS AND MAD SCIENTISTS!**

**The mixing of non-compatible materials or formulations not previously tested by chemical professionals, should be avoided. Volatile "brews" can be damaging and costly to repair and dispose of. Leave the burden of mix up compatibility to the people who manufacture and sell the products to you!

****YOUR SPRAYER WARRANTY IS VOIDED IF DAMAGE OCCURS AS A RESULT OF A MISUSE OF CHEMICALS****

- Mix times may vary by chemical, load size, water temperature and operator skill (experience).
- **Normal mix times can be 20 to 30 minutes per tank!** This allows enough time to provide complete particle distribution throughout the complete mixable liquid in tank.
- Just because the water is murky and clouded doesn't mean all the chemical is completely in suspension. **Give it some time!**
- At the completion of mixing phase and when the material is fully solublized, you are now ready to spray the mix to your turf areas.
- If machine is equipped with SDI's Quick Foam Marking System, refer to Operation's Manual for application techniques.
- Be sure to allow enough spray overlap on end nozzle to cover the foam ball with a dissipating spray. This technique allows for proper pattern overlap

and the water from the spray speeds up the disappearance of the foam from the turf.

****NOTE**** Failure to hit the foam ball with the spray from the end nozzle could result in an area of turf that is not being treated with your spray.

Troubleshooting:

Cannot get enough pressure:

- Settings exceed pump capacity
- Vehicle RPM's are set too low
- Vehicle's auxiliary hydraulics not working or switched on
- Spray tips too large
- Tank empty
- Hydraulic fluid in system at low level
- Bottom load valve on pump suction off or partially closed
- Liquid foaming in tank
- Suction vacuum leak/crack in hose
- Suction strainer screen clogged
- Valves improperly set

Operational Checks During Extended Product Applications:

- Frequently check your control pressure gauge for any change in your original calibration setting. A rise in the pressure should alert you to a clogged or partially blocked spray tip. Routine nozzle screen cleanings and use of all factory standard strainer screens will greatly reduce the chance of this from happening. Another possible cause for an increase in pressure could be the increase of engine speed. We recommend the use of a truck governor or throttle lock set for your desired speed.
- One last cause for a system pressure increase could be from the increase in hydraulic oil temperature. As the hydraulic oil's temperature goes up, the viscosity gets thinner. Under ideal conditions, the thinner oil can pass through the hydraulic motor easier which may increase the number of RPM's. This small increase can be managed through the use of the pressure adjust feature on the sprayers boom controls.
- Pressure loss can also occur during a spray application, loss of engine speed, loss of a spray tip, or excessive wear on all spray tips can together or singly to impact the performance of your sprayer. Frequent checks of your calibration will result in better system performance.
- The use of SDI's Motorized Valves with metered bypass can also affect the system pressure if not properly adjusted. Refer to Motorized Valve adjustment procedure for more help. The metered bypass affects the system pressure only when one or more sections are turned off. Loss or gain of pressure should not occur when all sections are on at once, because metered bypass option in non-

operational (when valve is on) only bleeds the system bypass during valve shut down (off position).

- Another possible cause of pressure loss on the system could be the result of a clogged suction strainer. Your system uses a self-priming diaphragm pump. If the suction strainer screen becomes clogged, it restricts the flow of water to the pump. Under high liquid requirement applications, the output could drop enough to cause the system to lose pressure. Keep your strainer screen clean and it will protect your diaphragms too!
- Also, be sure the strainer bowl is properly tightened with the gasket in place. An improperly tightened bowl can result in a suction leak which will result in loss of fluid to the pump (same as getting a crack in a drinking straw – hard to pull liquid up through the straw to your mouth!).
- Another pressure loss cause could be the loss of system hydraulic fluid. This is rare and would require a large fluid loss to affect the PTO speed of the pump.
- A possible cause of pressure loss could be that the ceramic discs in the agitator assembly are missing or damaged.

If any other problems arise, consult your local dealer or contact the factory.

More Operational Checks:

- If equipped with a speedometer, verify speed occasionally. The use of the ground speed governor or throttle lock control can maintain ground speed to keep your application rate on target. Stable speed is one of your necessary sprayer constants.
- Boom wing orientation (levelness to the ground) option can assist over uneven terrain. You should verify a consistent nozzle height during application.
- During turnarounds while stopped, visually check the tank liquid sight tube for the amount of spray left in the tank. DO NOT do this operation during forward movement. Keep your eyes forward to avoid accidents.
- If using a computerized controller, periodically check the data/rate screen for proper rate output. If not holding the desired rate, consult the controller User's Manual, your local dealer or the factory.

Between Tank Loads (refills):

- Check vehicle fuel level, fill as needed.
- Check solution tank on Foam Marker – fill as needed.
- If using wettable powders or equivalent, check suction strainer and nozzle tip strainers for possible debris build up. Clean as needed. Avoid costly and messy "in-field" service of plugged nozzle screens by checking and cleaning often.
- Refer to your calibration charts and area measurements to verify your application coverage is as planned. Make any necessary adjustments to obtain your correct rate. A 10% error in application rate can cost you hundreds of

dollars in lost time and chemicals, not to mention the possibility of turf grass damage.

When the Job is Finished / Sprayer Clean-Up:

Sprayers are often neglected during the winter, at the cost of valuable time and money in the spring to fix cracked or broken fittings, hoses, or pumps that have seized.

Your sprayer is a long term investment. All sprayers' components, from tank to tips, should be checked. Items that need replacement should be listed. Replacement parts should be purchased during the off-season.

Sprayers should be protected against the harmful effects of snow, rain, sun, and strong winds. Moisture in the air, whether from snow, rain or soil, corrodes metal parts of unprotected equipment.

The sun helps reduce moisture in the air, but it also causes damage. Ultraviolet light softens and weakens rubber materials such as hoses. The best protection from the environment is to store sprayers in a dry building. Storing sprayers provides an opportunity to work on them any time during the off-season, regardless of weather conditions.

Clean Up:

Prior to storage, clean the sprayer thoroughly with a cleaning solution. Which solution to use will depend on the pesticides used during the season? Always check the pesticide label for specific cleaning instructions. During cleaning, follow these general tips:

- Use a cleaning solution containing 2 pounds of detergent for each 30 – 40 gallons of water. This should be sufficient for removing most pesticides.
- First, flush the sprayer clean with clean water. Then add the cleaning solution to the tank. Agitate thoroughly and allow the water/detergent solution to circulate through the system for several minutes.
- Remove nozzles and flush the system twice with clean water.
- Clean nozzle tips and screen in a strong detergent solution or kerosene, using a soft brush, such as an old toothbrush.
- Some pesticide combinations may leave a putty type residue in the tank. Flushing out the residue of such chemicals after each load prevents an accumulation.
- If water alone doesn't dissolve the residue buildup, add Stoddard solvent, kerosene, or diesel fuel (1 gallon solvent for 25 gallons for water). Allow paste to dissolve, then agitate and flush. When cleaning tanks which have carried some phenoxy herbicides, such as esters of 2, 4-d, first rinse the sprayer with clean water and then rinse with one of the following, in 25 gallons of water:

- 1 quart of household ammonia
- 1 pound of baking soda
- 2 pounds of trisodium phosphate

Circulate this solution and let a small amount flow through the nozzles. Keep the remainder of the solution in the system overnight, and then pump it out in the morning.

During the final cleaning, examine the hoses, clamps, connections, no-drip valve, nozzle tips and screens for needed replacement.

DO NOT USE A PRESSURE WASHER ON YOUR CONTROL BOX!

Winterizing:

After the final cleaning, follow these tips to get the most out of your sprayer's life:

- Remove no-drip valve, nozzle tips, and strainers and dry them thoroughly. Clean tips with a toothbrush only. Store metal tips in a can of light oil, such as diesel fuel or kerosene.
- Store tips constructed of plastic and nylon in a dry place.
- Make a special effort in storing tips so that the orifices are not damaged by contacting each other or other parts such as loose screws.
- Drain water from all parts to prevent freezing. To insure the hoses are completely drained of water, purge them with compressed air.
- Pump requires special care – place automotive antifreeze with rust inhibitor in the pump and other sprayer parts. This also protects against corrosion and prevents freezing in case all water is not drained
- Tape or cover all openings, so that insects, dirt and other foreign material cannot get into system.
- Check the sprayer for scratched parts. Touch up these areas with paint to eliminate corrosion.
- Store sprayer in a clean, dry location within a building. If storage in a building is not possible, provide some sort of cover.
- Remove hoses, wipe them clean of oil, and store them inside a building. DO NOT hang them over a nail or sharp object. This causes a permanent crease that reduces flow through the hose. Coil hoses around a basket or other large round object to prevent sharp bends.



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